International Research Journal in Global Engineering and Sciences. (IRJGES)
ISSN : 2456-172X | Vol. 2, No. 1, March-May, 2017 | Pages 77-82

An Intensive Study on Platelet Count Concerning Severity in the Dengue Affected Patients

K. B Kishore Mohan, B.Kalpana, P. Aravinth

Department of Biomedical Engineering
Dhanalakshmi Srinivasan Institute of Technology, Samayapuram, Tamil Nadu, India

Abstract: The first epidemic of clinical dengue-like illness was recorded in Madras (now Chennai) in 1780 and the first virologically proved epidemic of DF in India occurred in Calcutta (now Kolkata) and Eastern Coast of India in 1963-1964. To Study platelet count with respect to Severity in the patients of Dengue at tertiary health care centre. This was Cross sectional observational study was conducted in a tertiary care hospital in the Department of Pediatrics after obtaining approval from the institutional Ethical Committee. The study was carried out over a period of one & half years from June 2016 to June February 2017. Statistical analysis done by Chi-square ,ANOVA , Paired t test SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Keywords – Dengue, Dengue Fever (DF) , Dengue Hemorrhagic Fever(DHF), Dengue Shock Syndrome (DSS)

Introduction:

The first epidemic of clinical dengue-like illness was recorded in Madras (now Chennai) in 1780 and the first virologically proved epidemic of DF in India occurred in Calcutta (now Kolkata) and Eastern Coast of India in 1963-1964. This was followed by an epidemic of dengue in Vishakapattnam in 1964, followed by epidemics at Vellore (1968), Ajmer (1969), Kanpur (1969), Jalore of Rajasthan (1985), New Delhi (1996, 2003, 2006, 2010)Chandigarh (2002), Mumbai (2004), Ludhiana (2007), Chennai (2006- 2008) and Kerala (2008), Odisa 2010.[1] Dengue fever is the most important mosquito spread viral disease and a major international public health concern. It is a self limiting disease found in tropical and sub-tropical regions around the world, predominantly in urban and semi-urban areas, recently spreading to rural areas also.[2]Dengue is a mosquito-borne viral illness caused by one of the four serotypes of the dengue virus (DENV;(DENV-1 to DENV-4) belonging to the family Flaviviridae. The virus serotypes are closely related but antigenically distinct. Dengue infections can result in a wide spectrum of disease severity ranging from an influenza-lik illness (dengue fever; DF) to the life-threatening dengue hemorrhagic fever (DHF)/dengue shock syndrome (DSS). In recent decades, the incidence of dengue infection has increased around the world and has become a major international public health concern. The Dengue is now endemic in more than 100 tropical and sub tropical countries.The World Health Organization (WHO) estimates that there may be 50 million dengue infections worldwide every year. Infection with one serotype of DENV provides lifelong immunity to that serotype, but results only in partial and transient protection against subsequent infection by the other three serotypes. It is possible for a person to be infected as many as four times, once with each serotype. It is well documented that sequential infection with different DENV serotypes increases the risk of

developing DHF. Ninety percent of DHF infections occur in children less than 15 years of age. There is currently no specific treatment for DENV infection, although several potential vaccines are in development; therefore, the only method of preventing DENV transmission is vector (mosquito) control Primary DENV infections present as either a non-specific illness or dengue fever (DF). Secondary infection with a serotype different from that causing primary infection may lead to DHF or DSS.13 A rapid and accurate diagnosis of dengue in the acute phase of illness is important for initiation of therapy & forecasting an early warning of an epidemic and in undertaking effective vector control measures.3,4. In a majority of cases the only feasible diagnosis is based on the detection of dengue antigens or antibodies [3], Dengue IgM and IgG ELISA kits are widely used for diagnosis of dengue infection in routine laboratories. However, there are variations in detection limit during acute phase of the disease. An ELISA specific to dengue virus NS1 protein has been developed for the detection of dengue NS1 antigen during the acute phase of disease in patients experiencing primary and secondary infections[3]

Methodology:

This Cross sectional observational study was conducted in a tertiary care hospital in the Department of PEDIATRICS after obtaining approval from the institutional Ethical Committee. The study was carried out over a period of one & half years from June 2016 to June February 2017.All data is collected after admission to our institute. The clinically suspected children (below 12years age) of dengue virus infection as per WHO guidelines 2009 admitted in a tertiary care hospital and serologically confirmed by dengue IgM positive test and those ready to give informed written consent were included into study while Cases of fever which are proved Dengue IgM Negative. Cases of fever where tests for other diseases like Malaria are positive Undiagnosed causes of fever with thrombocytopenia and those not ready to give informed written consent. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. ANOVA (Analysis of Variance) was the test of significance to identify the mean difference between more than two groups for quantitative data. Paired t test is the test of significance for paired data such as before and after surgery for quantitative data respectively. Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs such as bar diagram and Pie diagram. p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Table 1: Age distribution among cases

		Count	Percentage (%)
Age	< 5 years	13	25.0%
	6 to 10 years	29	55.8%
	> 10 years	10	19.2%
	Total	52	100.0%

Mean age of patients were 8.08 ± 2.72 years. Majority of subjects were in the age group 6 to 10 years (55.8%), 25% were in the age group <5 years and 19.2% were in the age group >10 years.

Table 2: Gender distribution of cases

		Count	Percentage (%)
Gender	Female	27	51.9%
	Male	25	48.1%
	Total	52	100.0%

Majority of cases were females (51.9%) and 48.1% were males with male to female sex ratio was0.92

Table 3: Laboratory investigation

		Frequency	Percentage (%)
Platelet count (n=50)	< 50,000	13	26
	50,001-1,00,000	24	48
	> 1,00,000	13	26

Table 4: Platelet count comparison among cases at different intervals

	N	Mean	SD	P value
Day 1	50	84923.60	46765.45	
Day 2	43	93790.70	45296.15	0.398
Day 3	41	101575.61	48945.63	0.118
Day 4	32	110593.75	62617.56	0.059
Day 5	32	140437.50	65578.29	**0.007***
Day 6	15	180800.00	72845.43	**0.008***
Day 7	15	250013.33	139810.08	**0.021***

In the study it was observed that mean platelet count on day 1 was 84923.60±46765.45 and gradually increased to 250013.33±139810.08 on day 7. There was significant increase in platelet count from day 5 till day 7. Thrombocytopenia (platelet count <1lakh) was observed in 74% of cases.

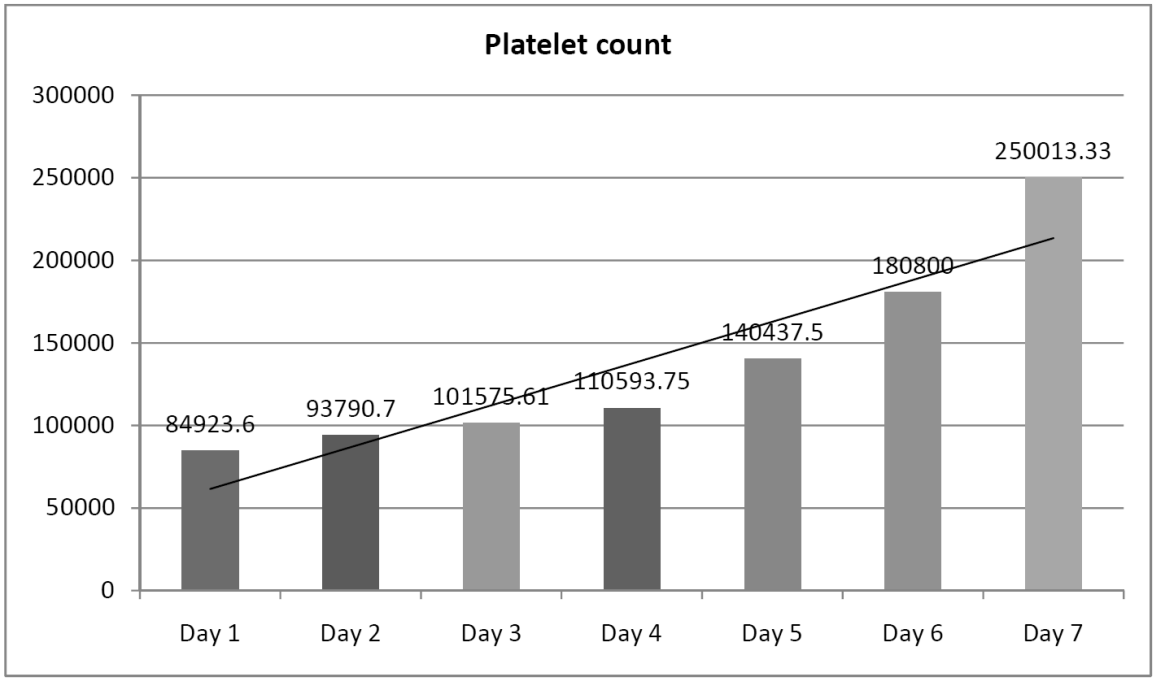

Figure: Bar diagram showing Platelet count comparison among cases at different intervals

Table 5: Comparison of Platelet count between three groups during follow-up

	Dengue Classification						P value
	Dengue Fever without warning signs (n=27)		Dengue Fever with warning signs (n=21)		Dengue Shock Syndrome (n=4)		
	Mean	SD	Mean	SD	Mean	SD	
Day 1	91637.69	57834.00	75156.00	34968.00	65000.00	16093.48	**0.001***
Day 2	107791.70	43629.00	74823.53	44027.00	85000.00	7071.07	**0.001***
Day 3	109368.40	56391.00	97280.00	42281.00	89500.00	67175.14	**0.001***
Day 4	134500.00	67373.00	88153.85	49195.00	77000.00	36769.55	**0.002***
Day 5	149933.30	76951.00	129142.90	59783.00	148500.00	26162.95	**0.005***
Day 6	189500.00	45950.00	195142.90	96171.00	90000.00	-	0.112
Day 7	280000.00	124900.00	265011.10	149353.00	112550.00	137815.11	0.08

From the table 15 and graph 15 it can observed that there was significant difference in platelet count between three diagnoses of dengue fever from Day 1 till Day 5. Increasing trend of platelet count was observed in all the three
groups.

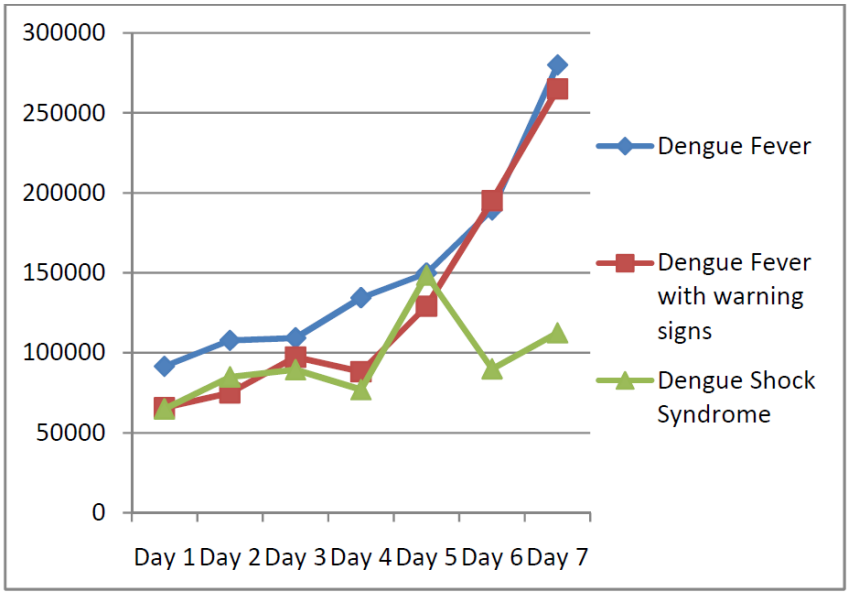

Figure : Line diagram showing Comparison of Platelet count between three groups during follow-up

Discussion:

In the study it was observed that mean platelet count on day 1 was 84923.60±46765.45 and gradually increased to 250013.33±139810.08 on day 7. There was significant increase in platelet count from day 5 till day 7 as in most of studies.Our study is comparable with study by dash et al. in which thrombocytopenia was a common finding and the mean platelet count was 68,000.5 Average platelet count on admission notedwas 94,640/cu mm (SD 70,000). Mean duration required for normalization of platelet count was 3 to 5 days (4 days)by Kamath et al.40In study by C.V. Pratyusha et. al. in which mean platelet count of 55810 + 43079.7

Name of study		**Percentage of thrombocytopenia**
Alam AS et al[8]		68.5%
Kamath et al[9]		68%
Malavige et al[10]		70.2%
Srinivasa et al[11]		97%
Maimoona et al[12]	2005	66.5%
	2006	68.76%
	2007	100%
	2008	67.58%

Conclusion:

It can be concluded from our study that there was significant increase in platelet count from day 5 till day 7there was significant difference in platelet count between severity (DF,DHF,DSS) of dengue fever from Day 1 till Day 5. Increasing trend of platelet count was observed in all the three groups.

References:

[1] Guzmán MG, Kourí G. Dengue diagnosis, advances and challenges. International journal of infectious diseases. 2004 Mar 31;8(2):69-80.

[2] World health organization :guidelines for prevention and control of Dengue, zoonosis division, National institute of communicable disease: World health organization;2006

[3] Shrivastava A, Dash PK, Tripathi NK, Sahni AK, Gopalan N, Rao PL. Evaluation of a commercial Dengue NS1 enzyme linked immunosorbent assay for early diagnosis of dengue infection. Indian journal of medical microbiology. 2011 Jan 1;29(1):51.

[4] Mahapatra D, Sarangi G, Mahapatra A, Paty BP, Das P, Chayani N. NS1 Antigen Capture ELISA an Effective Method for Diagnosis of Early Dengue Infection-Report of an Outbreak at Angul District, Odisha, India. J ClinDiagn Res.2014Aug;8(8):8-10.

[5] Dash PK, Saxena P, Abhyankar A, Bhargava R, Jana AM. Emergence of dengue virus type-3 in northern India. Southeast Asian journal of tropical medicine and public health. 2005 Mar 1;36(2):370.

[6] Kamath S, Jain N, Gupta S, Jha AC, Rao BS. Dengue Epidemic in Jamshedpur-Tata Main Hospital (TMH) Experience. Journal of Tropical Diseases & Public Health. 2015 Jul 9;2015.

[7] Prathyusha CV, Rao MS, Sudarsini P, Rao KM. Clinico-haematological profile and outcome of dengue fever in children. International Journal of Current Microbiology and Applied Sciences. 2013;2(10):338-46.

[8] Alam AS, Sadat SA, Swapan Z, Ahmed AU, Karim MN, Paul HK, Zaman S. Clinical profile of dengue fever in children. Bangladesh Journal of Child Health. 2009;33(2):55-8

[9] Kamath S, Jain N, Gupta S, Jha AC, Rao BS. Dengue Epidemic in Jamshedpur-Tata Main Hospital (TMH) Experience. Journal of Tropical Diseases & Public Health. 2015 Jul 9;2015.

[10] Malavige GN, Ranatunga PK, Velathanthiri VG, Fernando S, Karunatilaka DH, Aaskov J, Seneviratne SL. Patterns of disease in Sri Lankan dengue patients. Archives of disease in childhood. 2006 May 1;91(5):396-400.

[11] Srinivasa S, Tanveer Nawab, Chaithanya C Nair. Clinical profile and ultasonogaphic findings in children with dengue fever. Current Pediatric Research 2014; 18 (2): 87-90

[12] Ahmed MM. Clinical profile of dengue fever infection in King Abdul Aziz University Hospital Saudi Arabia. The Journal of Infection in Developing Countries. 2010 Apr 13;4(08):503-10.

[13] Moorthy M, Chandy S, Selvaraj K, Abraham AM. Evaluation of a rapid immunochromatographic device for the detection of IgM & IgG antibodies to Dengue viruses (DENV) in a tertiary care hospital in South India. Indian journal of medical microbiology. 2009 Jul 1;27(3):254.